

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 30 JUN 2006

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Applicant's or agent's file reference Cal 89141		<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. PCT/EP2005/001223	International filing date (day/month/year) 04.02.2005	Priority date (day/month/year) 23.02.2004	
International Patent Classification (IPC) or national classification and IPC INV. C10G47/16 C10G47/18 C10G47/20 B01J29/08 B01J29/12 B01J29/16 B01J29/14			
Applicant POLIMERI EUROPA S.P.A.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand  20.09.2005		Date of completion of this report  29.06.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized officer  Gilliquet, J-N  Telephone No. +31 70 340-4573	



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2005/001223

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**Box No. I Basis of the report**

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1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
  - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
    - ☐ international search (under Rules 12.3(a) and 23.1(b))
    - ☐ publication of the international application (under Rule 12.4(a))
    - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-45 as originally filed

**Claims, Numbers**

2(part), 3-39, 40(part) as originally filed

1, 2(part), 40(part), 41-48 received on 15.12.2005 with letter of 14.12.2005

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☒ the claims, Nos. 40,48
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	46
	No: Claims	1-45,47
Inventive step (IS)	Yes: Claims	
	No: Claims	1-47
Industrial applicability (IA)	Yes: Claims	1-47
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

**Re Item I.**

- 1 The amendments filed with the letter dated 14/12/2005 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendments concerned are the following: the cancellation of elements of the disclaimer of claim 40 introduces subject-matter that is not to be found in the application as filed. Introduced claim 48 is not supported by the application as filed. Therefore the examination has been carried out on the basis of newly filed claims 1, 2 and 41-47 and 3-40 in their original version.

**Re Item V.**

- 1 Reference is made to the following document:  
D1 : DE 23 12 999 A (MOBIL OIL CORP) 27 September 1973 (1973-09-27)
- 2 INDEPENDENT CLAIM 1
  - 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.  
Document D1 (see p.15 §2, ex. 15,16,18 and tab. 3) discloses a process of cracking hydrocarbons in the presence of hydrogen producing alkanes containing less than 6 carbon atoms, in contact with a catalytic composition comprising Zn on a Y-zeolite and rare earth oxide.
  - 2.2 The argument developed by the applicant in his letter dated 14.12.2005 has been considered by the Examination Authority that came to the conclusion that hydrogen is present in the examples of D1 (See I.33 of tab.3 of D1). Moreover D1 cites the possibility of using the catalyst in a hydrocracking process. Therefore the inclusion of this feature in claim 1 does not render it new over document D1.

**3 INDEPENDENT CLAIM 40**

- 3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 40 is not new in the sense of Article 33(2) PCT.  
Document D1 (see ex. 15,16,18 and tab. 3) discloses a catalytic composition comprising Zn on a Y-zeolite and rare earth oxide.

**4 INDEPENDENT CLAIM 42**

- 4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 42 is not new in the sense of Article 33(2) PCT.  
(see p.13 last § - p.14 §2, ex. 15,16,18 and tab. 3) discloses a process of preparation the catalytic composition according to claim 40, which comprises treating the zeolite with a compound of Zn by means of ion exchange, drying and calcining.

**5 INDEPENDENT CLAIM 45**

- 5.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 45 is not new in the sense of Article 33(2) PCT.  
Document D1 (see p.15 §2, ex. 15,16,18 and tab. 3) discloses a process of cracking hydrocarbons in the presence of hydrogen producing alkanes containing less than 6 carbon atoms, in contact with a catalytic composition comprising Zn on a Y-zeolite and rare earth oxide.

**6 INDEPENDENT CLAIM 46**

- 6.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 46 does not involve an inventive step in the sense of Article 33(3) PCT.

- 6.2 Document D1 (see ex. 15,16,18 and tab. 3) is regarded as being the closest prior art. It discloses a catalytic composition comprising Zn on a Y-zeolite and rare earth oxide.
- 6.3 The subject-matter of claim 46 therefore differs from this known composition in that the composition further comprises a metal of group VIII.
- 6.4 The problem to be solved by the present invention may therefore be regarded as providing an alternative catalytical composition.
- 6.5 The solution proposed in claim 46 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) as the applicant did not demonstrate a technical effect of this feature.

- 7 **DEPENDENT CLAIMS 2-39, 41, 43, 44 and 47**  
Dependent claims 2-39, 41, 43, 44 and 47 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

Claim 47 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempt/s to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

CLAIMS

- 1) A process for the production of linear alkanes containing less than 6 carbon atoms which comprises putting a mixture comprising one or more hydrocarbons containing  
5 at least 6 carbon atoms, in presence of hydrogen, in contact with a catalytic composition comprising:
- a) at least one element Me selected from Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, metals of group VIII Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt,
- 10 b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B,
- with the exclusion of a catalytic composition comprising  
15 at least one lanthanide, at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B when the mixture treated is  
20 a mixture containing aromatic compounds.
- 2) The process according to claim 1, wherein the mixture comprises one or more hydrocarbons containing at least 6 carbon atoms, selected from aromatic compounds, open-chain alkanes or alkanes with cyclic structures, al-  
25 kenes having one or more unsaturations with open chains

In, W, Ta, Zr, Ti, metals of group VIII, Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt,

b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti  
5 or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B,

with the exclusion of a catalytic composition comprising at least one lanthanide., ~~at least one metal belonging to~~

~~group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the~~  
10 ~~Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B.~~

41) The catalytic compositions according to claim 40, additionally containing one or more lanthanides.

15 42) A process for preparing the catalytic composition according to claim 40, which comprises treating the zeolite with a compound of the element Me by means of ion exchange or impregnation, drying and calcining.

43) A process for preparing the catalytic composition  
20 according to claim 41, which comprises treating the zeolite with a lanthanide compound, treating the product thus obtained with a compound of the element Me, drying and calcining.

44) The process according to claim 43, wherein the lan-  
25 thanide is inserted in the zeolite in acidic form by



means of ion exchange, optionally calcining the product thus obtained, the element Me is then deposited by ion exchange, and the product obtained is dried and calcined.

45) A process for the production of linear alkanes containing less than ~~at least~~ 6 carbon atoms from mixtures  
5 containing aromatic compounds having a structure with at least 6 carbon atoms, in presence of hydrogen, using a catalytic composition consisting of:

a) at least one element Me selected from Zn, Mo, Cu, Ga,  
10 In, W, Ta, Zr, Ti, mixed with one or more metals of group VIII,

b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the alumi-  
15 num with Fe, Ga or B,

c) one or more lanthanides.

46) A catalytic composition consisting of:

a) at least one element Me selected from Zn, Mo, Cu, Ga,  
20 In, W, Ta, Zr, Ti, mixed with one or more metals of group VIII,

b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the alumi-  
num with Fe, Ga or B,

25 c) one or more lanthanides.

47. The process according to claim 33, wherein the resulting fraction of n-alkanes prevalently consists of ethane, propane and n-butane.

48. A process for the production of linear alkanes containing less than 6 carbon atoms which comprises putting  
5 a mixture comprising one or more hydrocarbons containing at least 6 carbon atoms, in contact with a catalytic composition comprising:

a) at least one element Me selected from Zn, Mo, Cu, Ga,  
10 In, W, Ta, Zr, Ti, metals of group VIII Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt,

b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum  
15 with Fe, Ga or B,

with the exclusion of a catalytic composition comprising at least one lanthanide., ~~at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the~~  
20 ~~Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B when the mixture treated is a mixture containing aromatic compounds.~~